Forest Management in Alberta

BURGESS-LANE MEMORIAL LECTURE
University of British Columbia
January 16, 1986
Presented by F. W. McDougall
Deputy Minister
Renewable Resources
Alberta Energy and Natural Resources

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ALBERTA'S FOREST RESOURCE

Most of northern Alberta is covered with a Boreal Mixedwood forest in which white spruce and two poplar species (aspen and balsam poplar) predominate. Extensive stands of jack pine exist in the northeast. There is a subalpine lodgepole pine/white and black spruce forest of considerable magnitude along the foothills, from Grande Prairie to the U.S. border. This subalpine forest accounts for more than half of our total timber production, although it covers only 34 000 square miles as opposed to 120 000 square miles in the boreal.

A map of Alberta's ecological regions (see page 2) shows that two-thirds of Alberta is suitable for timber production. Only the grasslands in the south-east, and the Boreal Subarctic are not suitable though productivity is very low in the Boreal Northlands.

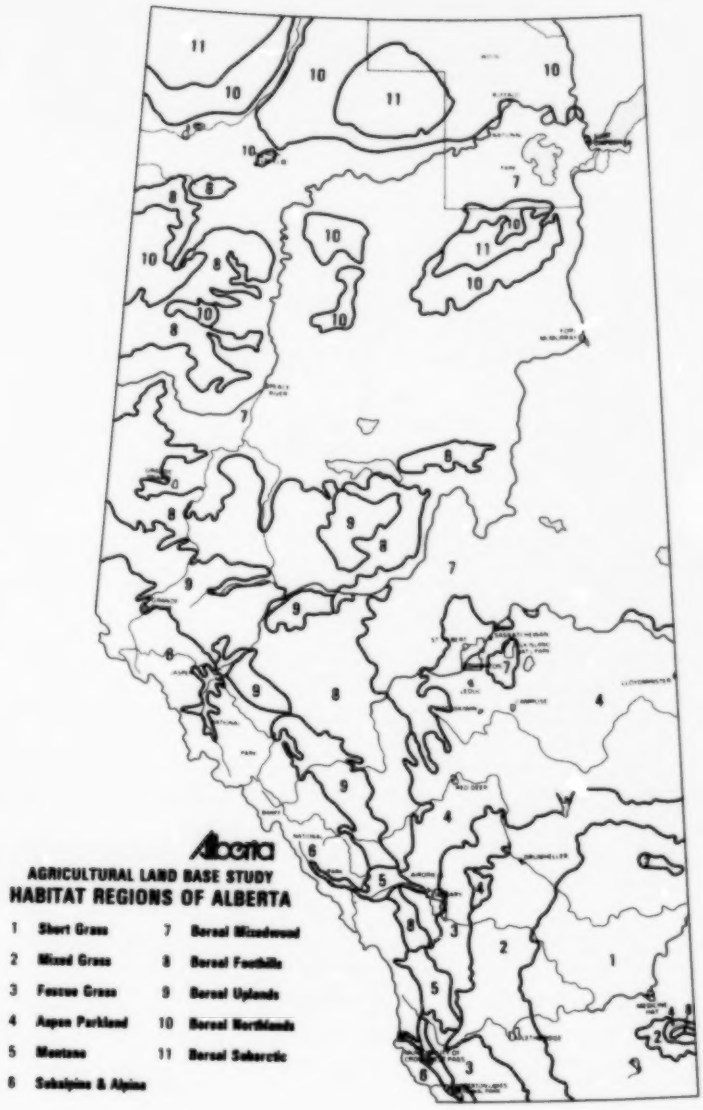
Productivity

Alberta's productive forest lands total 21 million hectares, or 42 per cent of the productive forest area in B.C. This places us fourth in Canada, with about half as much productive forest land as either Ontario or Quebec.

Because Alberta has deep fertile clay and silt soils extending to its northern boundary, our productive lands are among the best in Canada's boreal forest, although they fall well below the productivity of the B.C. coast, montane and Columbia forest regions, and below most of the St. Lawrence lowlands and Maritime provinces. Under full stocking, softwood growth here could generally average about four cubic metres per hectare per year over a 70-year rotation. So the potential exists to produce 80 million cubic metres, or 18 billion board feet (log scale), of coniferous timber per year. Actual productivity is much below this figure, primarily because of fire losses, poor age-class distribution, inadequate stocking and under-utilization.

Wood Volumes

Alberta's forests are presently understocked, carrying only 2.6 billion cubic metres, or an average of 125 cubic metres per hectare of wood volume, distributed by species as on the


Alberta
AGRICULTURAL LAND BASE STUDY
HABITAT REGIONS OF ALBERTA
1 Short Grass
2 Mixed Grass
3 Fescue Grass
4 Aspen Parkland
5 Montane
6 Subalpine & Alpine
7 Boreal Mixedwood
8 Boreal Foothills
9 Boreal Uplands
10 Boreal Northlands
11 Boreal Subarctic

following chart:

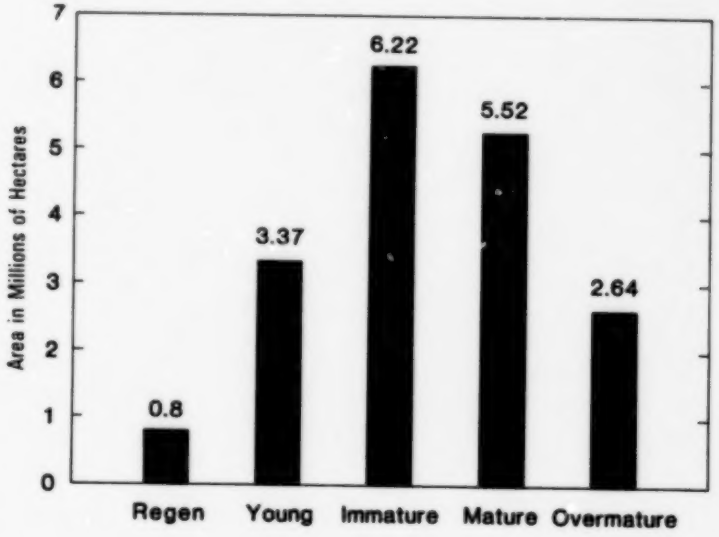
Total Provincial Timber Volumes

Species	Volume (m^3)
White Spruce	747 571 000
Black Spruce	129 747 000
Pine	634 451 000
Fir and Larch	77 617 000
Other Deciduous	1 030 147 000
TOTAL	**2 619 533 000**

It should be noted that almost 50 per cent of the total wood volume is deciduous, nearly all of which is either aspen or balsam poplar.

On the positive side, it is important to note also that Alberta's low wood volumes reflect a preponderance of young growth, as much as understocking. Alberta's extensive forest fire losses through the period 1930 to 1960 have left extensive areas of young coniferous and deciduous stands which do not yet contribute much wood volume, but which are beginning to make a substantial contribution to the annual allowable cut.

Age-Class Distribution of Alberta's Forest



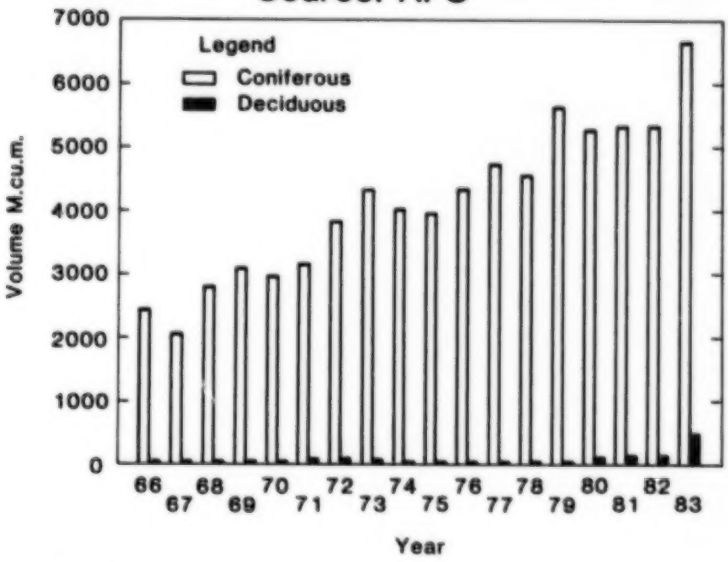
Supply

The actual calculated annual allowable cut of softwoods from Alberta's existing forest growing stock is 14.2 million cubic metres or about three billion board feet (log scale).

There is an additional allowable cut of 12 million cubic metres of hardwood or almost six million cords, nearly all of which is poplar. The comparable softwood annual allowable cut figure for British Columbia is 73.5 million cubic metres, which is roughly five times the Alberta softwood cut.

Annual Roundwood Production in Alberta

Source: AFS



Utilization

The present level of harvest in Alberta (1984-85) is about 6.5 million cubic metres, six million cubic metres of it softwood. The deciduous (poplar) cut was 471 000 cubic metres in 1984, a major increase from previous levels reflecting the successful operation of the new Oriented Strand Board plant at Edson, Alberta. We have two plants using poplar in commercial quantities: the Weldwood waferboard plant at Slave Lake, Alberta, and Pelican's large new plant in Edson.

ALBERTA'S FOREST INDUSTRY

Production

In the fiscal year ending March 31, 1984, Alberta produced:

	Production	Unit Value Can. $	Value
Lumber	1 213 000 mfbm	$193.80	$235 079 400
Pulp	480 000 M tonnes	$681.85	$327 288 000
Plywood	210 million sq.ft. (⅜")	$196.00	$ 41 160 000
Waferboard/ O.S. Board	240 million sq.ft. (⅜")	$174.15	$ 41 796 000
Misc. Posts	238 700 m^3	$116.00	$ 18 000 000
			$663 323 400

The value of these products is estimated at just over $660 million per year. This is about five per cent of the annual value of manufacturing shipments in the province. The industry created about 6 500 person years of direct employment.

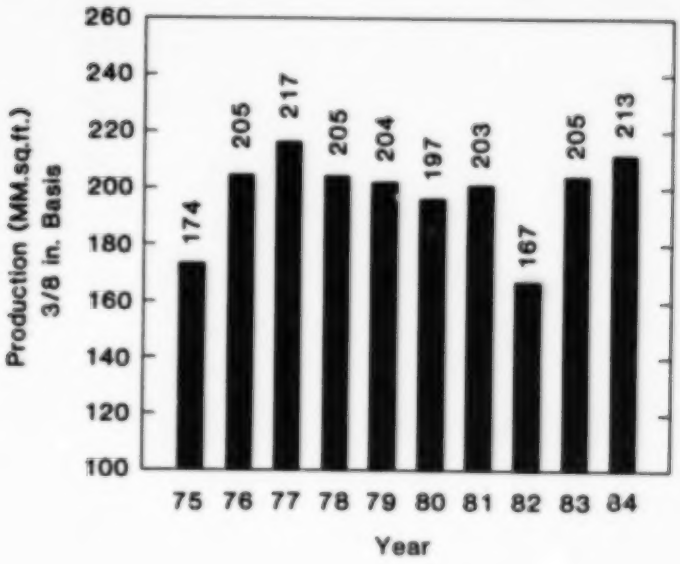
These figures are modest by British Columbia standards where more complete utilization of the annual cut has allowed a harvest 10 times greater than in Alberta. Nevertheless, in comparison with other provinces, Alberta's forest industry is tied with New Brunswick for fourth place, behind British Columbia, Ontario and Quebec.

Characteristics of Alberta's Forest Industry

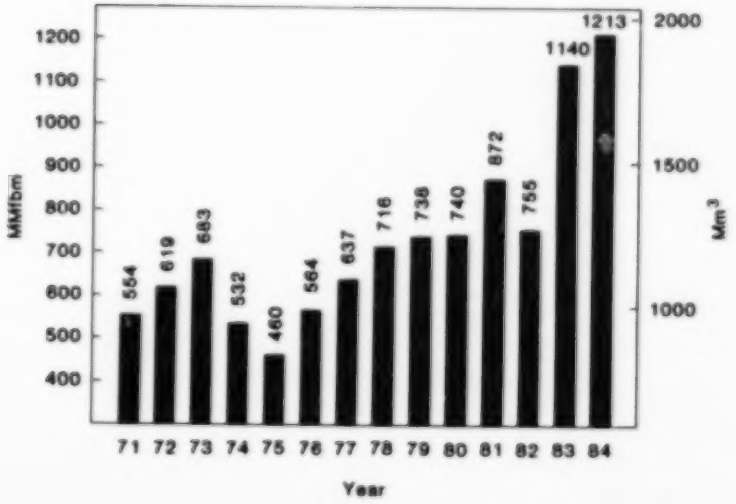
Alberta's forest industry consists of two dozen major sawmills, producing 1.1 billion board feet of lumber a year and more than one million cubic metres of wood chips. Another 300 small sawmills operate on a part-time basis and produce, altogether, less than 100 million board feet of lumber annually primarily for farm and local use. There are **two** major bleached kraft pulp mills, **two** building paper mills, **three** plywood mills, **one** waferboard mill and **one** oriented strand board plant. There are 18 wood treating plants producing 200 000 cubic metres of treated wood products annually, primarily fence posts. Nearly all these mills are cost competitive, efficient producers.

Total direct employment in the forest industry is approximately 7 000 jobs. Wood costs in Alberta are low.

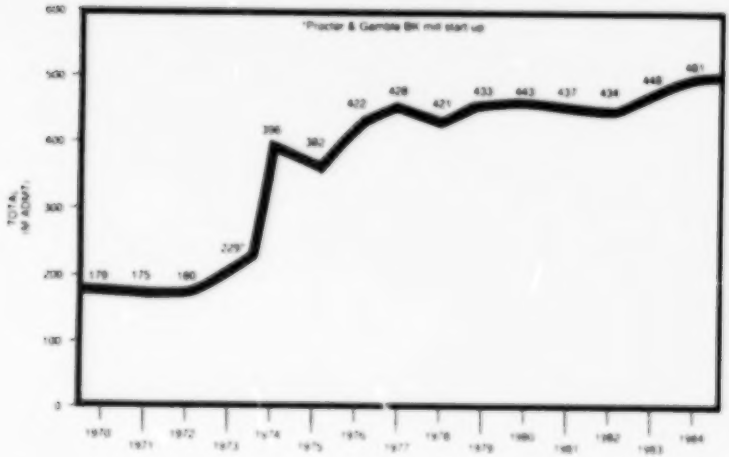
Alberta Softwood Plywood Production



Lumber Sales Volume in Alberta



BLEACHED KRAFT PULP – ALBERTA
PRODUCTION



Alberta's efficient owner-operated logging contractors, working on generally favorable terrain, are able to deliver logs to sawmills for about $25 per cubic metres, or about $100 per thousand fbm. Low dues, power and labor rates in sawmills enable most mills to put lumber in the rail car for $200 (Can.) per thousand fbm.

Chip prices in Alberta average about $30 per bone dry unit at the sawmill, approximately half the equivalent price in B.C. Our chips often move a long way. Procter & Gamble trucks chips from Canfor's mill at High Level, more than 300 miles from Grande Prairie.

Managing the Timber Harvest

In order to produce this volume of forest products, it is necessary to cut over some 28 600 hectares (71 000 acres) of forest land each year. This constitutes a major challenge in forest management. In order to insure that the yield from the forest can be increased (doubled) on a **sustained** basis, and to protect the environmental quality of our forests, the Alberta Forest Service, working with our forest industry, has developed a complete program of forest management. Some of the priority needs we have worked hard to meet are:

1. **A good forest inventory** - We must know volumes, ages, rates of growth on various sites in order to plan the harvest, and know how much wood of various ages can be cut from different areas. In Alberta, harvest is scheduled into oldest, least-healthy stands **first** - young fast-growing stands are left for a later harvest. The Province of Alberta has recently completed a re-inventory of its forest resource, at a cost of $15 million over a 10 year period. The results of this inventory are now being analyzed and allowable cuts in all management units are being recalculated.

2. **A good forest management plan** - We must schedule harvest and road development many years in advance, and assess impact on aesthetics on watershed, wildlife and recreation.

3. **Good annual operating plans** - Detailed operating plans to effectively control timber operations are essential to avoid site-specific problems and damage to other resources.

FOREST LAND MANAGEMENT

Land Use Policy

Nothing is more critical to the future of our forest industry than good management of the forest resource. Land use policies are an important requirement for successful forest management. One cannot practise forestry, certainly not on a sustained-yield basis, without a secure land base.

Since 1948, Alberta has set its forest lands aside in a Green Area, within which indiscriminate land sales or settlements are forbidden. Land can be withdrawn from the Green Area only after a review has established that the lands are better suited to use other than forestry. Such withdrawals normally occur on the periphery of the forest, as roads and other services are extended logically to expand farming areas. The bulk of these withdrawals occur in the Peace River-Fort Vermilion area.

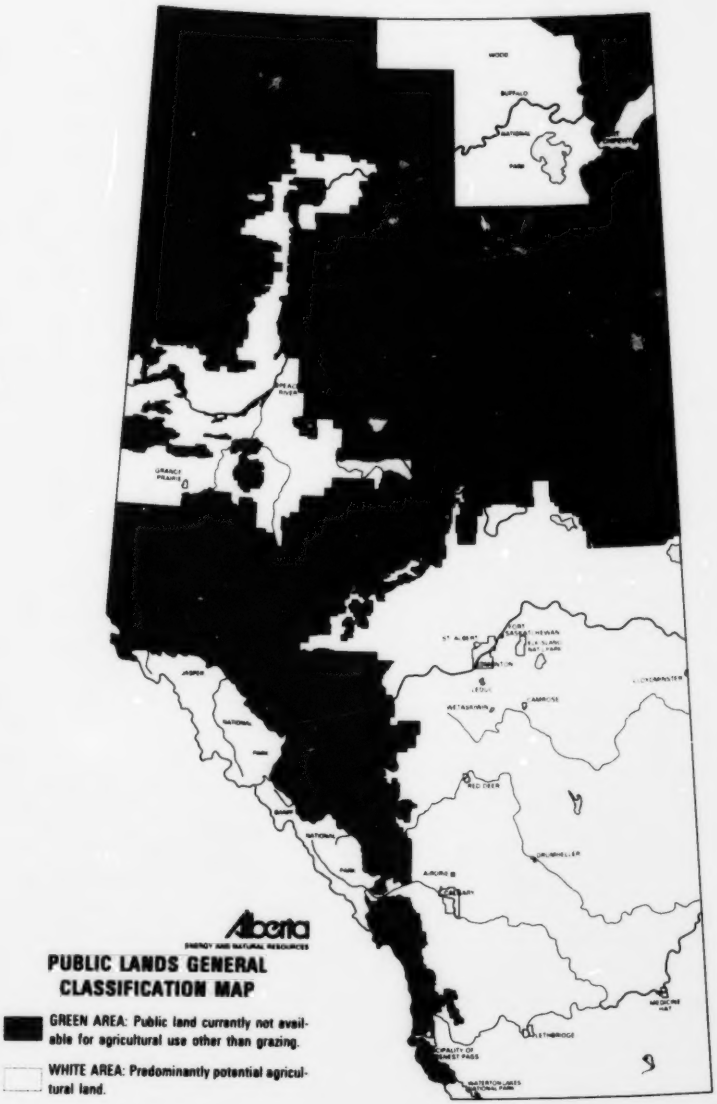
Forest Land Use Within the Green Area

Because Alberta is not fully using her forests for timber production, it would be wrong to conclude that Provincial forests outside the National Parks are quiet areas of unspoiled wilderness. Alberta's forests are presently experiencing hectic levels of use. Where else in Canada, except perhaps in parts of British Columbia, could all of the following take place on one quarter section - hunting, fishing, camping, grazing, trapping, coal, oil and gas? But watershed is most important, on the Eastern Slopes.

The forests on the Eastern Slopes of the Rockies, which contain the headwaters of the Saskatchewan River system, have been recognized as essential watersheds for the prairies since 1911. Beginning with forestry pioneers like P. Z. Caverhill and H.R. MacMillan, forest management in Alberta has recognized the important role our forests play in water flow regulation.

Recreation

Alberta's forests have always been a refuge from the summer heat of the prairies. Recreational use demands have


Alberta
ENERGY AND NATURAL RESOURCES
PUBLIC LANDS GENERAL CLASSIFICATION MAP
GREEN AREA: Public land currently not available for agricultural use other than grazing.
WHITE AREA: Predominantly potential agricultural land.

skyrocketed to the point where the province has established Kananaskis Country, a multiple-use recreation area where intensive levels of management are applied to integrate major recreational developments with watershed, forest management, grazing and highly controlled mineral exploration and development. Similar high levels of recreational demand are also evident further north along the foothills, west of Rocky Mountain House. Throughout Alberta's forests, the Alberta Forest Service operates 128 campgrounds, with capacity for over 3 000 overnight campsites. The Forest Service also maintains almost 600 miles of hiking and snowmobile trails.

In view of the intense and major demand for recreational forest land, there is concern over the possibility that large areas of forest will be allocated exclusively to recreation, and exclude forest management for other benefits. It is our hope that we can develop policies and procedures in Kananaskis Country that will enable us to successfully manage for both recreation and timber production.

Wildlife

Like British Columbia, Alberta's forest lands offer unparalleled big game hunting opportunities. Not only do we have the usual Boreal species, like moose, black bear and deer, but also the less common Bighorn sheep, mountain goat, elk and even grizzly and cougar. We license 55 000 big game hunters annually. Trapping is an important source of income for many. Some of the best stream fishing in the province is in the forested areas, and there are over 300 000 licensed anglers in the province, with that number increasing at the rate of more than 10 000 per year. Persons over 65 and under 14 do not require a licence, so there are about half a million people who fish in a province where less than 2.5 per cent of the total area is water covered.

Grazing

Grazing is a long established activity on forest lands in Alberta. Grazing leases and licences are issued in forest areas in northern Alberta in locations where grazing will not damage coniferous growth. Also, grazing allotments have been issued along the Eastern Slopes since the inception of the forest reserves, with over 12 000 cattle grazed on these each summer.

Energy Resources

Alberta's economy is built largely on the oil and gas industry. The Alberta government has been able to fund forest fire control and forest management programs at a level which is 10 times greater than its direct forest revenue, only because it has enjoyed substantial oil and gas revenues. Oil and gas roads have been a real benefit for forest protection and for logging access.

But there is a negative side. Over the past 40 years, almost one million acres of Alberta's forests have been cleared as a result of oil and gas exploration and development. About 40 per cent or 400 000 acres of this clearing has taken place in productive coniferous stands. While softwood timber of commercial size is usually salvaged, up to one-sixth of the forest may be cleared in highly developed oil fields.

Although more localized, coal development is threatening to remove significant areas of forest land from production for prolonged periods. While reclamation will insure restoration of productivity in mined areas, the infrastructure requirements, such as powerlines, roads, townsites, rail spurs and mine buildings, will remove substantial areas for longer periods of time. There are presently four major coal mines operating in Alberta's forests but the interesting thing to note is that at least six more mines are under active consideration on some of our most productive forest lands.

Agriculture

Agriculture is the foundation of Alberta's economy. Public lands are leased and sold for agricultural use at a significant rate. The pace of agricultural land sales is being maintained at 100 000 acres annually. At the same time, about 15 000 acres per year are being cleared for improved grazing, primarily on grazing reserves in forest areas. It should be emphasized, however, that these developments are carefully planned, and while they generally occur on productive land in forest areas, they are usually confined to lands which are not stocked with coniferous forest. The land is only made available after careful study has shown it should be released from the Green Area, because it will produce more value for society under agricultural use, than as forest.

Land Use Planning

As a consequence of the high levels of industrial and recreational activity on provincial crown lands, Alberta has developed what we believe to be the most advanced land use planning system now operational in Canada. Initial emphasis has been placed on implementing this system on the Eastern Slopes of the Rockies, because of the importance of this area for watershed, recreation and timber production.

Eastern Slopes Policy

We began with a detailed land use and resource allocation study for the Eastern Slopes in the early 1970s. Public hearings were held by the Environment Council and a policy paper on land management in the Eastern Slopes was approved by Cabinet and published in 1977. This is the only detailed land management policy which has been published by any government in Canada for an area of this magnitude. It contains land use zones at a scale of 1:500 000 with permitted uses established for each zone. The policy has been followed absolutely by all government departments since it was published in 1977. In 1984, the policy was revised, to eliminate a few obvious inconsistencies, to introduce a minimal level of flexibility on a site specific basis, and to place more emphasis on more detailed planning as more detailed integrated land management plans are developed.

Obviously planning at a scale of 1:500 000 is less than site specific. It was the best that could be done for an area of 34 000 square miles in just a few years. However, it was recognized from the outset that much more detailed planning would be required, to properly implement the intent of the Eastern Slopes Policy and to deal with site specific issues, such as agricultural expansion and the confirmation of the Green Area boundary.

Integrated Management Plans

With the approval of the Eastern Slopes Policy in 1977, the Department began a comprehensive planning program for all of Alberta's public lands. Land management plans are being developed which integrate the planning for all land uses by all

government departments. The planning is done by regional resource management staff who are assigned to planning teams, with the support of head office specialists. The planning teams consult closely with local interest groups and the local M.L.A. as the plan is developed. Starting with a detailed biophysical base map, information on specific resource values (such as timber, gravel, oil, gas, critical

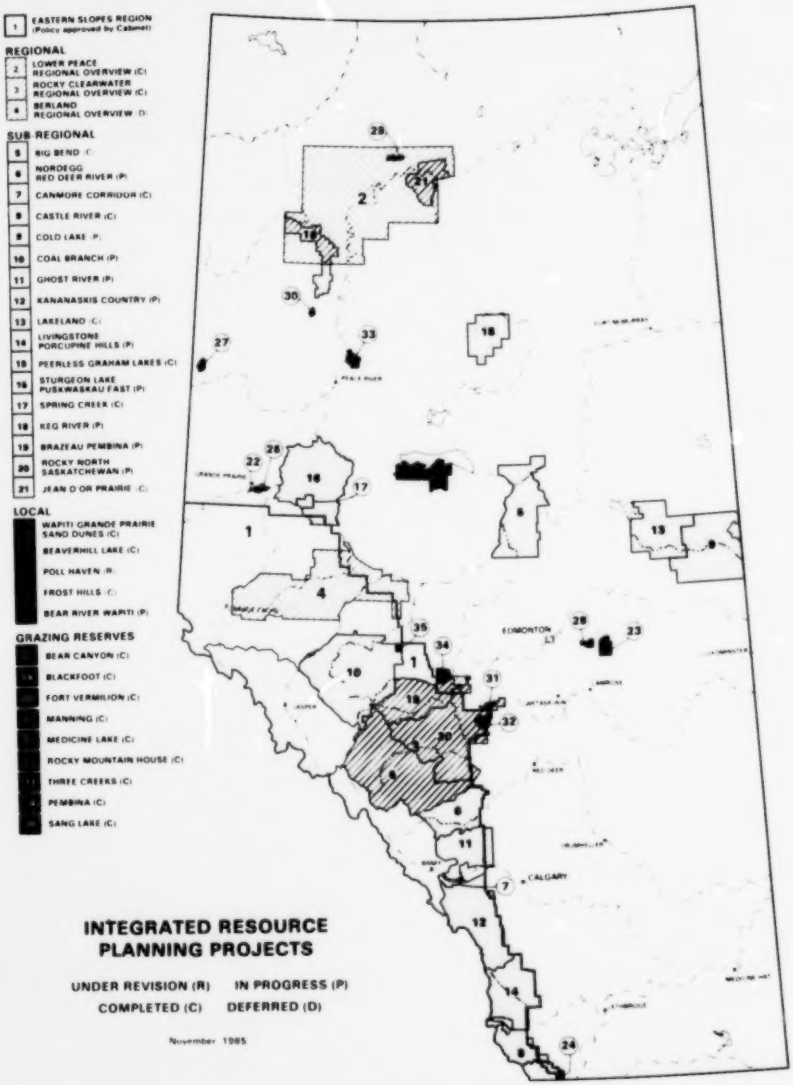
TABLE OF COMPATIBLE ACTIVITIES BY LAND USE ZONE

ACTIVITY \ ZONE	1 PRIME PROTECTION	2 CRITICAL WILDLIFE	3 SPECIAL USE	4 GENERAL RECREATION	5 MULTIPLE USE	6 AGRICULTURE	7 INDUSTRIAL	8 FACILITY
Non-motorized recreation	■	■	▨	■	■	■	▨	■
Fishing	■	■	▨	▨	■	■	▨	□
Hunting	■	▨	▨	▨	■	■	▨	□
Scientific study	▨	▨	▨	▨	■	■	□	■
Trapping	▨	▨	▨	▨	■	■	□	■
Trails, non-motorized	▨	▨	▨	■	■	■	▨	■
Transportation & utility corridors	▨	▨	▨	▨	■	■	■	■
Primitive camping	▨	▨	▨	■	■	■	□	□
Intensive recreation	▨	□	▨	■	■	▨	▨	□
Off-highway vehicle activity	▨	▨	▨	▨	■	▨	■	■
Logging	▨	▨	▨	▨	■	■	▨	▨
Domestic grazing	▨	▨	▨	▨	■	■	□	▨
Petroleum and natural gas exploration & development	▨	▨	▨	▨	■	■	■	▨
Coal exploration & development	▨	▨	▨	▨	■	■	■	□
Mineral exploration & development	▨	▨	▨	▨	■	■	■	□
Serviced camping	▨	▨	▨	■	■	▨	▨	■
Commercial development	▨	□	▨	▨	▨	▨	▨	▨
Industrial development	▨	□	▨	□	▨	▨	▨	▨
Residential subdivisions	▨	□	▨	□	▨	■	▨	▨
Cultivation	▨	□	▨	□	▨	■	▨	▨

■ Compatible Use — Uses that are considered to be compatible with the intent of a land use zone under normal guidelines and land use regulations.

▨ Permitted Use — Uses that may be compatible with the intent of a land use zone under certain circumstances and under special conditions and controls where necessary

□ Not Permitted Use — Uses that are not compatible with the intent or capabilities of a land use zone.



INTEGRATED RESOURCE PLANNING PROJECTS

UNDER REVISION (R) IN PROGRESS (P)
COMPLETED (C) DEFERRED (D)

November 1985

wildlife areas, fishing access etc.) is added and present uses and commitments are carefully considered. The planning team then strives for a consensus on an optimum combination of land uses and land use zones.

Although this planning process is very time consuming, the Department has now obtained Cabinet Committee approval for five plans, covering an area of 4 791 square miles. The early plans went slowly as it took some time to get the planning system established and working. However there are another 10 plans in an advanced stage of development, and we anticipate being able to complete six or seven plans annually at current budget levels.

The plans are a major benefit to resource managers, as they clearly define land use priorities. For example, approved plans clearly delineate those lands which are secure for long term timber production, and those which may eventually be required for agricultural production. Areas which are critical for watershed protection, wildlife and fisheries, or which must be maintained for recreational uses are also identified.

ALBERTA'S FOREST TENURE SYSTEM

Forest Management Agreements

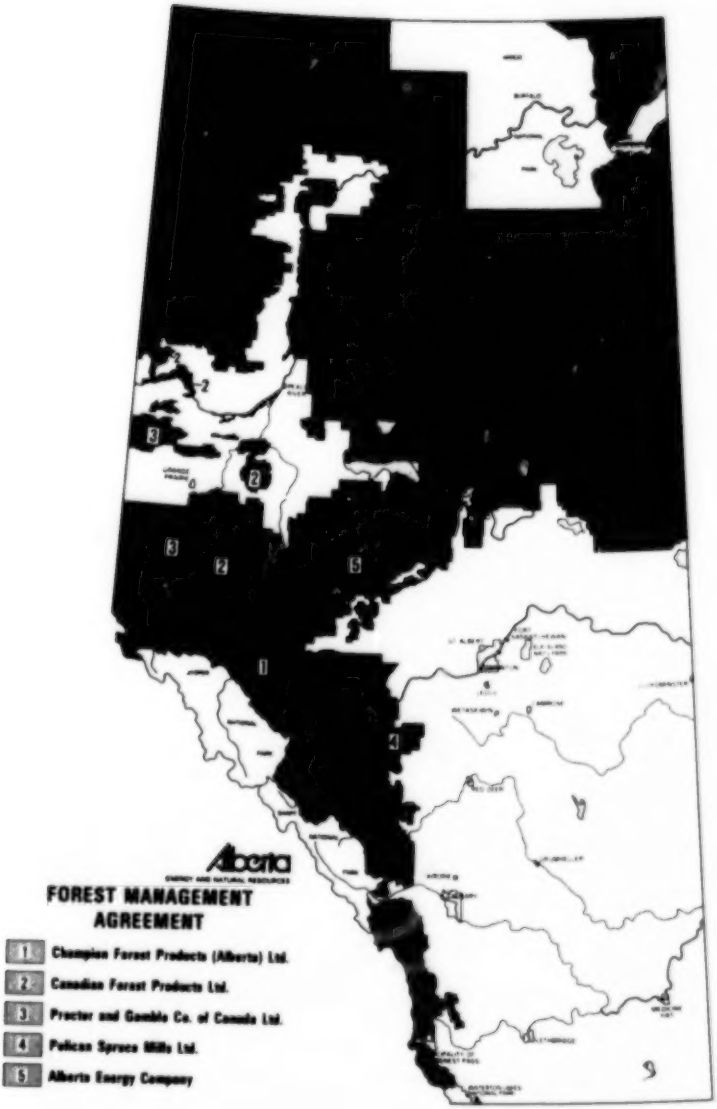
Another important provision was the development of the Forest Management Agreement in 1954. These agreements provide long-term tenure in that they are issued with terms of 20 years which are renewable. Initially, the agreements conveyed only timber cutting rights, although sustained-yield management was mentioned. In 1958, however, the rights were broadened to include the right "to manage, cut and remove the timber from the pulpwood lease area . . ." In 1963, the wording was further amended to read as follows: "The Minister gives to the Company the right to enter upon and use the land to grow and harvest timber in accordance with the terms of this Agreement." It can be seen that the Forest Management Agreements have evolved from timber cutting rights to a continuing right to use the land for timber production and harvest.

From the beginning, the agreements have required that harvest be established at substantial levels, based on a forest management plan which projects harvest levels for the entire rotation, which at present is 80 years for pine and spruce on most agreements in Alberta.

Forest management planning standards are high. Each plan must be based on a completed and thorough forest inventory which accurately measures the volume and area of each age class in the forest, so that realistic growth projections can be made and age-class problems identified. Priority is given to removing the oldest timber first even though it may not be the closest to the mill. This fact alone, the removal of the decadent stands and retention of the younger stands which are still growing, is having a positive effect on average growth rates.

All Forest Management Agreements require complete reforestation of all cut areas to provincial standards, with no cost to the Province.

At the present time there are five active Forest Management Agreement areas in Alberta, covering 15 000 square miles (30 000 square kilometres) or 10 per cent of our provincial forest lands. Yet these areas count for much more than half of the total value of Alberta's primary timber production.


Alberta
ENERGY AND NATURAL RESOURCES
FOREST MANAGEMENT AGREEMENT
1 Champion Forest Products (Alberta) Ltd.
2 Canadian Forest Products Ltd.
3 Procter and Gamble Co. of Canada Ltd.
4 Pelican Spruce Mills Ltd.
5 Alberta Energy Company

Timber Quotas

Long term timber rights are conveyed by quota where an industrial establishment, such as a sawmill, cannot achieve complete utilization of the entire softwood forest. In the future, as sawmills are able not only to use some 6-4 (six inch stump to a four inch top) trees but can economically use timber stands composed primarily of such small trees, it may be possible to consider Forest Management Agreements in place of quotas in some situations. Improved chip markets are probably a prerequisite to this happening.

Of course, quotas are issued for 20-year renewable terms, just like forest management agreements. The difference is that the quota does not give a land use and forest management right as does an agreement. The quota is a volume agreement, whereby the Forest Service manages an identified forest management unit to supply an agreed volume of wood.

All quota cuts are reforested at the expense of the quota holder. At the present time, all forest inventory and forest management planning is done by the Forest Service, but the quota holder does his own annual operation plan for Forest Service approval.

FOREST MANAGEMENT

The Alberta legislature has endorsed two basic objectives for forest management in Alberta. The objective for forest management is stated as follows:

> to manage Alberta's forest lands in a manner ensuring a perpetual supply of benefits and products while maintaining a forest environment of high quality.

The objective for timber management is consistent with this, and provides that the Forest Service is to:

> manage Alberta's timber resources to obtain increased and perpetual timber harvests while maintaining a forest environment of high quality.

In order to accomplish these objectives, it is necessary to have good land use policies and planning and a well managed timber harvest. Both of these elements have already been described in earlier sections. However, more is needed. The

complete and successful reforestation of harvested areas, and effective forest production, are both essential.

Reforestation

Alberta has recognized and responded to the need for forest renewal as evidenced in the development of our first Forest Management Agreement in 1955 and the subsequent development of Quota Policy in 1966. The Forest Management Agreements and Quota Policies have required industry to complete reforestation work or to provide funding for the government to complete reforestation work on all cutovers of permanent forest land. Results have been most encouraging. Over 93 per cent of all cutovers 10 years or older have passed a regeneration survey. The seven per cent represent failed treatments which will be retreated or alternate reforestation areas may be selected.

Over the past five years Alberta has continued to expand its forest renewal programs.

Alberta's Maintaining Our Forest program has now treated 47 000 ha of potentially productive forest land; afforested to offset recent losses to the productive forest base from land withdrawal, fire and industrial development. The Program which began in 1978 and is nearing completion has seen an

investment of $25 million. Unfortunately, much of this plantation will require additional expenditures for brush control, as the spruce seedlings are presently under extreme competitive pressure from poplar regrowth.

The recent Federal-Provincial agreement will provide $6.4 million, over five years, for forest renewal and improvements on provincial forest lands (stand tending, stand cleaning and wildfire reforestation).

The Timber Management Regulations have been revised to give more direct responsibility to industry in reforestation programs. Timber harvesting companies with quotas which exceed 34 000 cubic metres annually are now responsible for basic reforestation treatment, while smaller companies maintain the option of doing their own reforestation or paying a levy indexed at the cost of reforestation. The levy is presently $2.30 per cubic metre.

Reforestation Policy and Standards

The Alberta Forest Service enforces a stringent reforestation policy to ensure that forest productivity is not diminished during the second rotation. This policy requires that:

1. All cutovers must be restocked within 10 years of harvest completion.
2. When and where required, artificial reforestation treatments must be completed within two years of harvest.
3. A formal regeneration survey must be completed by the operator to monitor initial success of treatment by the end of the seventh year.
4. Further treatment, if required, is mandatory in the eighth year.
5. A formal regeneration survey is required by the end of the tenth year to provide that the area is sufficiently restocked.

Provincial reforestation standards require:

1. A minimum of 800 evenly distributed trees per hectare (of acceptable species).
2. Acceptable species: all native conifers with some limitation on alpine/balsam fir.

3. Seedling age at time of survey: minimum two years for pine, three years for all other species and three years on site for all planted stock.
4. A sufficiently restocked block may not contain unstocked areas larger than four hectares.
5. All seedlings must be healthy, vigorous, and at least of minimum age.

Reforestation objectives have now turned from merely establishing satisfactory stocking levels to achieving superior growth. Innovations in site preparation, fertilization, vegetation control, genetics, drainage and thinning are being developed and put into place.

State of the art computerization of Alberta Forestry Regeneration records has resulted in standards being maintained.

Pine Ridge Nursery

Any effective forest management program requires reliable and adequate supplies of high-quality seed and seedlings. Until 1981 this was a real problem in Alberta, as inadequate nurseries were unable to provide adequate stock on a reliable basis.

These problems have been solved with the establishment of a new forest nursery near Smoky Lake. The nursery was completed in 1980 at a capital cost of just over $12 million. It included a major seed extraction and seed cleaning plant, as well as a first-class seed storage facility. Tree seed is extracted, cleaned, sorted and stored for the forest industry without charge as well as for the Forest Service.

The nursery was originally built to grow 10 million containerized and 10 million bareroot seedlings per year. This capacity is now expanded to a total of 36 million seedlings per year, of which 20 million will be container seedlings and 16 million bareroot. The nursery currently has a modest genetics laboratory and greenhouse which was improved and expanded in 1985 at a cost of more than $1 million. The total cost of the expanded nursery and genetics facility now stands at $16 million.

The size and quality of the seedlings out of Pine Ridge is now remarkably good, and there is no question that this facility has improved planting success and field survival in a major way.

Intensive Silviculture

At the present time, Alberta is concentrating on basic forestry: prompt and complete reforestation; improved forest protection; better stand utilization; and intelligent harvest scheduling to replace old, diseased, damaged and low-vigor stands with healthy young regeneration.

However, we are aware that this approach needs to be supplemented with further measures if the growing of forest crops is to make efficient use of the land. The intensive management priorities in Alberta are as follows:

1. **Drainage**
   There are 28 million acres (11 million hectares) of muskeg or peat bog in Alberta's forest areas. While some of this has excellent long term potential as an energy source, and some is important for water flow regulation, there are at least 10 million acres (four million hectares) which could be drained and added to the productive forest land base at reasonable cost. This potential is just now being examined and experimental drainage programs are now being developed.

2. **Genetic Improvement**
   The Alberta Forest Service and the forest industry have combined their efforts in a well planned tree improvement program. Emphasis is on the use of superior lodgepole pine and white spruce seedlings in our reforestation efforts. We have already identified a large number of superior trees of both species and are beginning to establish seed orchards to preserve this superior stock and provide convenient sources of superior seed.

3. **Tree Improvement Committee**
   We have also established a tree improvement committee, with strong participation from the forest industry. The committee is considering the allowable cut increases which are likely to occur from such activities as juvenile spacing, fertilization, cleaning and weed tree removal, genetically improved planting stock, thinning, drainage, and improved species-site combinations.

Forest Fire Control

Forest fire control in the unmanaged forests of northern Alberta is a severe problem. There are vast areas, almost 50 000 square miles or 130 000 square kilometres, in northern Alberta which are not now under management but which have regenerated to pure or mixed-wood stands of spruce and pine with poplar, following extensive fires in the period 1930 to 1960.

These represent a major resource potential and could support a much expanded forest industry in Alberta beginning in 2010. Unfortunately, extreme weather conditions in 1980, 1981 and 1982 have resulted in major fire losses of more than 16 000 square kilometres in this area. This loss was in spite of a major fire control effort involving expenditures of more than $170 million in three fire seasons.

Major improvements have been made to our fire control organization in the past three years with the installation of a complete lightning detection system and by increasing our initial-attack resources.

Alberta Fire Management Enrichments

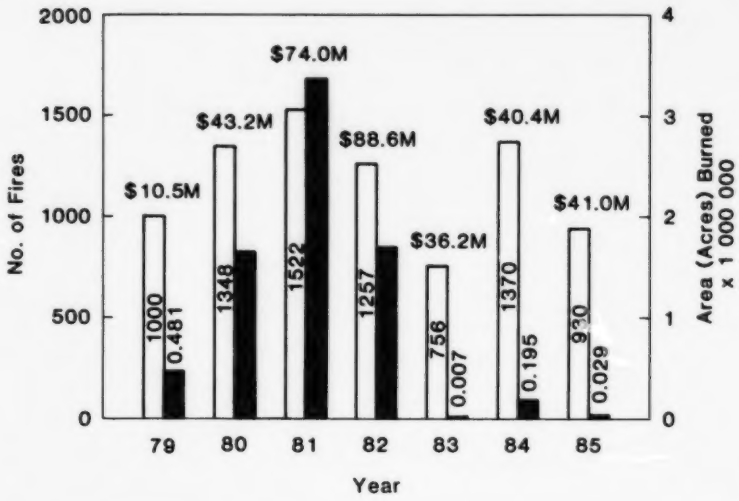
Resource Items	1980 Level	1981 Enrichment	1982 Enrichment	1983 Enrichment	1983 Level
Air Tankers	11	3, B-26's 1, DC-6	1, DC-6	1, DC-6	17
Retardant Bases	13	1		1	15
Initial Attack Bases	0	3	2	1	6
Staging Camps	26	5	9	2	42
Detection Lookouts	143	1	1		145
Helitak Crews c/w Medium Rotary Wings	1	4	2	2	9
25 Man University Crews	0		1	2	3
Teletype System Replacement			1		1
Communications Multi Campaign Fire Kits	0		2		2
LLP System (Lightning Detection)	0	7, D.F.'s	1 P.A. & Network Conversion		1 Complete System
RAWS Automatic Wx. Stations	0		5		5
Micro-Computers (Apple III's)	0		14		14

There is every indication that these improvements paid off over the past three years when the Forest Service was able to cope very effectively with a severe hazard period. Continued diligence will enable us to retain our young northern forests as a basis for a much expanded forest industry in the North in forty or fifty years' time.

Conclusion on Forest Management

The significance of our emphasis on forest management is that it has placed our forest industry on a secure basis for the future. All of our mills have secure future wood supplies, although most will have to make the adjustment to six- and four-inch trees since the future wood flow will be in smaller trees, as the old-growth timber is replaced by younger wood.

Fire Suppression in Alberta



LOOKING TO THE FUTURE

There are two major projects now under construction in Alberta's forest industry.

Pelican Spruce Mills has announced the immediate construction of a second Oriented Strand Board (Sturdiwood) plant at Drayton Valley. This plant will be very similar to Pelican's existing and highly successful plant at Edson. It will produce more than 150 million square feet (⅜") of board annually. The capital cost of the plant will be approximately $50 million.

The Alberta Energy Company is well along with the construction of a medium density fibre-board plant at Blue Ridge, near Whitecourt, Alberta. This plant has a capital contruction cost of about $25 million, and will utilize sawmill residues for most of its wood requirements.

Beyond these projects, there is ample scope for continued growth and expansion. There are two large spruce-pine areas available in central Alberta. The Berland area, west of Whitecourt has an available coniferous allowable annual cut of 1.1 million cubic metres. The Nordegg area, west of Rocky Mountain House, has an available coniferous allowable annual

cut of 0.4 million cubic metres. These wood supplies are supplemented by the availability in central Alberta of 250 000 units of chips from existing sawmills. Chip prices in Alberta are averaging about $30 per unit, the lowest in Canada. The province is seeking integrated lumber-pulp (paper) development based on these areas. Further sawmill expansion, without an accompanying pulp development, would only aggravate the oversupply of wood chips in the Province.

There are extensive uncommitted areas in northern Alberta. These are located in our boreal mixed-wood forest region, where forest stands consist primarily of white spruce and aspen growing together. Fortunately, the new chemi-mechanical pulping technology favors the use of these two species. We therefore hope that Alberta's readily available timber supplies, low wood costs, productive and stable labor climate, and low energy costs will result in a northern pulp development in the near future.